3D Animation for Computer Graphics

CPSC-4381

Spring 2022  Section 48F  3 Credits  03/21/2022 to 05/10/2022  Modified 03/30/2022

Meeting Times

This course is online.

Contact Information

Instructor: Dr. Tim Roden
Office: Maes 96
E-mail: Tim.Roden@lamar.edu (Preferred contact method)
Phone: 880-2179

For most communication, please send me mail using Course Mail while you are in the Blackboard course. If you need immediate assistance then send me mail directly to my Lamar email address, listed above.

Catalog Description

This introductory course in three-dimensional (3D) animation covers techniques for programming in C++ and creating content designed for use in real-time computer graphics applications using appropriate software with particular emphasis on computer games and character animation. Topics include rigid versus non-rigid body animation, skeletal techniques, morphing, kinematics, animation blending, key framing, time coding, motion capture, lip sync, synchronization methods, file formats and a survey of current software tools and techniques. Prerequisite: COSC 2336 Pre- or Co-Requisite: COSC 3306 It is also recommended that students complete CPSC 4380 prior to taking this course.

Objectives

Outcomes

Students who successfully complete this course will be able to:

- Construct 3D models with appropriate rigging for use in real-time 3D animation.
- Create animation sequences for 3D models.
- Produce software that demonstrates morphing animation.
- Produce software that demonstrates rigid-body animation of hierarchical 3D models.
- Produce software that demonstrates non-rigid-body animation of skeletal character models.
- Combine animation sequences using real-time blending techniques.

Course Materials

Required Text: None

Required Electronic Course Materials: Lightwave 2015 (available in Maes room 218 and also available as a free demo online)
Course Policies

Accreditation Standards

Evaluation

8 Assignments  800 points (100 points each)
TOTAL POINTS  800

Students can track their progress in the course by logging into Blackboard each week and looking at the grade book. In addition, the instructor will provide feedback via Blackboard mail to each student for each assignment submitted within one week after the due date of each assignment.

Institutional Policies

Academic Honesty Policy

Lamar University expects all students to engage in academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action.

The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion, and the abuse of resource materials.

All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include failure of the assignment and/or course up to suspension or expulsion from the university. The penalty may vary by instructor.

Additional information is available on the Academic Policy website (https://students.lamar.edu/academic-support/academic-policies.html).

Course Drop Policy

Students may drop a course and receive a grade of "Q" during the penalty-free period of the semester or session. For drops after this penalty-free period, grades are recorded as "Q" or "F," indicating the student was passing or failing at the time of the drop. A grade of "Q" may not be assigned unless an official drop has been processed through the Records Office. Students may drop a course online up to the census day by logging into Self-Service Banner. After the census day, courses must be dropped through the Records Office. For additional help, contact the academic advisor or the Records Office at registration@lamar.edu. Students may not drop a course during the last 20 percent of the term. Students should check the academic calendar at https://www.lamar.edu/academic-calendar (https://www.lamar.edu/academic-calendar) for specific dates.

Students with Disability Policy

Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communication building, room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations.
If you have, or think you may have, a disability (e.g. mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 409-880-8347 or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations.

If you are registered with the DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course.

Additional information is available at the DRC website (http://www.lamar.edu/disability-resource-center/).

Academic Support

Academic Support can be located at https://www.lamar.edu/students/#acad-supp.

There are many areas (i.e. Advising, Writing Center, etc.) of academic support. Each area provides their own specific contact information and days and hours of operation.

Student Services

Lamar University recognizes that students may experience challenges that hinder success in their academics and/or college experience. We believe in giving all students access to resources that allow them to overcome these challenges. If you are struggling with stress, procrastination, anger management, depression, anxiety, substance abuse and/or eating disorders, please reach out to our counseling professionals at the Student Health Center at 880-8466 to call for an appointment or visit our website https://www.lamar.edu/students/student-engagement/student-health-center/index.html for more information about our services.

Students who face challenges securing food or housing, tuition and/or books and believes this may affect their performance in the course is urged to contact the LU Strong program. The program is located in the Setzer Student Center, Room 230 at 409-880-8458 or at lustrong@lamar.edu. Furthermore, please notify your professor if you are comfortable in doing so. This will enable them to provide any additional resources they may possess.

Your information and situation will be treated with the utmost privacy and is protected by Texas law. These services are available to all currently enrolled students at Lamar University and Lamar Institute of Technology.

Information on Student Services can be located at http://students.lamar.edu/index.html. There are many resources (i.e. Course schedules, important phone numbers, etc.) available. Each area provides their own specific contact information and days and hours of operation.

Academic Continuity Policy

In the event of an announced campus closure in excess of four days due to hurricane or other disaster, students are expected to check Lamar University's website and login to LU Connect for instructions about continuing courses remotely.

Emergency Procedures

Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at the Office of Environmental Health/Safety and Risk Management (https://www.lamar.edu/about-lu/administration/risk-management/index.html) webpage.

Severe Weather

Follow the directions of the instructor or emergency personnel.

Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.

If you are in a multi-story building and you cannot get to the ground floor, pick a hallway in the center of the building.

Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter

CALL - 7777 from a campus phone (Text 409-241-8002 from a cell phone). Note: Calling 911 from either a campus or cell phone can be dangerous and hazardous.
phone will contact the City of Beaumont dispatch rather than the LU police.

**AVOID** - If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.

**DENY** - Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.

**DEFEND** - Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

**Copyright Policy Statement**

Copyright is defined as the ownership and control of the intellectual property in original works of authorship which are subject to copyright law. As an institution of higher learning that values intellectual integrity, Lamar University prohibits the distribution of published materials (print or electronic) in violation of copyright law.

**LU Connect Portal**

Students are asked to obtain a Lamar Electronic Account username and password so they can log onto the LU CONNECT website. Students may get information on how to get into the LU CONNECT website from the University’s homepage (http://www.lamar.edu) by clicking on the LU CONNECT link on the left top corner of the screen. Follow the steps to secure your LU CONNECT username and password.

**LU Learn/Blackboard Learning Management System (LMS)**

Students will utilize the Lamar University’s Learning Management System (LMS), Blackboard, for online courses. For Blackboard technical support go to https://blackboardsupport.lamar.edu. Phone: 866-585-1738. Phone and chat are available 24/7/365. Exams and quizzes taken within LULearn (Blackboard) may require online proctoring. Lamar University uses Proctorio for online proctoring. For additional information about online proctoring click here (https://www.lamar.edu/lu-online/student-support-services-quick-links/index.html#proctoring-services) and view details under proctoring services.

**Network Use**

**ACCEPTABLE USE**

Students must respect the integrity and security of Lamar University computer systems and network, and the privacy and preferences of other users. Responsibility for learning about and complying with Lamar University Acceptable Use Policy ultimately rests with the individual. The network may be used to download, copy, or store any software, shareware, digital media files or freeware, as long as the use complies with copyright law licensing agreements, and campus policies, such as storage space limitations and network bandwidth restrictions. The network may not be used for any activity, or to transmit any material, that violates United States or local laws.

**UNACCEPTABLE USE**

The network may not be used for commercial purposes. Advertising and sponsorships on Lamar University websites is restricted. In addition, students may not permit other persons to use their usernames, passwords, accounts or disk space, or disclose their usernames, passwords or account information to any third party. Students may not log on to someone else's account, internet address, or other network codes, or attempt to access another user’s files. Students may not create false or dummy accounts to impersonate someone else. Students may not try to gain unauthorized access ("hacking") to the files or computer systems of any other person or organization. Students may not impersonate another person by forging e-mail, web pages or other electronic media. Students who maliciously access, alter, delete, damage or destroy any computer system, computer network, computer program, or data will be subject to disciplinary action by Lamar University, and criminal prosecution as well. Students may not disrupt or attempt to disrupt network traffic, and they may not attempt to monitor or capture network traffic in any way. Finally, students may not intentionally create, store, display, print or transmit information that violates the university's Sexual Harassment Policy.
Netiquette (Online Etiquette) Statement

Please adhere to the same standards of behavior and professional respect online that you would follow in face-to-face communication with others, but most particularly when writing email and when taking part in collaborative and discussion board activities. Lamar provides access to network resources, including the Internet, in order to support learning and to prepare students for the 21st century world. Students, however, are expected to adhere to the Lamar University Acceptable Use Policies when Using Networks. More comprehensive student code of conduct can be found at https://students.lamar.edu/academic-support/code-of-conduct.html.

GENERAL GUIDELINES TO RESPECT ALL PARTICIPANTS

- Respect the right of each person to disagree with others.
- Treat people the same as you would face-to-face.
- Respect the time of others.

GUIDELINES WHEN COMMUNICATING WITH OTHERS (EMAIL, DISCUSSIONS, BLOGGING, AND ETC.)

- Always sign your name to any contribution you choose to make.
- Be constructive in your responses to others in the class.
- Do not use all caps (Doing so may be interpreted as shouting).
- Re-read your postings before sending them.
- Always think before you write.
- Respond respectfully.
- Use appropriate grammar and structure.
- Spell-check your postings.
- Use short paragraphs focused on one idea.
- Use appropriate business language at all times.

Technical Support

Technical Support can be located at http://students.lamar.edu/it-services-and-support/index.html.

Phone: 409-880-2222
Email: servicedesk@lamar.edu

Hours of Operation (CST):
Monday - Thursday 7:30 a.m.-12:00 a.m.
Friday 7:30 a.m. - 7:30 p.m.
Saturday 9:00 a.m. - 6:00 p.m.
Sunday 3:00 p.m. - 12:00 a.m.

Attendance Verification

Students must complete an Attendance Verification Quiz for ALL COURSES - both on-campus and online - in which they are enrolled each term by the third class day to comply with U.S. Department of Education attendance requirements. Failure to complete this quiz by the deadline may result in loss of course enrollment and/or financial aid. The quiz is located in EVERY COURSE through LULearn (Blackboard) even if the course meets on campus.

COVID-19 Statement

Lamar University returns to the 2021-2022 academic year after a pandemic that lasted more than 15 months. We will open for business without requirements for masks, vaccination requirements, or social distancing, as announced by Governor Abbott on July 29. However, for the health and safety of all concerned we encourage all faculty, staff, and students to take advantage of the free vaccines (available throughout the region and at the Student Health Center) as soon as possible. We strongly recommend that everyone continue to practice good personal hygiene practices including regular handwashing and/or use of hand sanitizing products when soap and water are not readily available. Please show respect to those who choose to practice social distancing measures and wear face coverings.

Everyone is asked to continue to self-screen for any signs or symptoms of COVID-19. Please seek medical attention if you begin to feel ill. Members of the Lamar community share significant and unrelenting responsibilities. As members of the larger world community, we have not only the opportunity but the duty to develop and to exhibit a sense of social responsibility. We are
responsible for each other and each of us must do what we can to protect our Lamar family and to remember that we have especially vulnerable populations among us (i.e., Lamar community members with chronic illnesses or disabilities, children, and factors that predispose many to respiratory ailments). As we look out for one another, our choices are of the utmost importance. Should state or federal guidelines change, we will provide updates as soon as practicable.

Course Subject Outline

Lecture Topics

The list of lecture topics below is tentative, and subject to change and adaptation.

<table>
<thead>
<tr>
<th>Topic Description</th>
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<tbody>
<tr>
<td>1  3D Graphics</td>
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<td>2  Development environment and tools</td>
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<td>3  Windows, DirectX, GX Toolkit</td>
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<td>4  Hierarchical modeling in Lightwave</td>
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<td>5  Rigid-Body animation programming</td>
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<td>6  Modeling and programming with morph animation, morph blending</td>
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<td>7  Text-to-speech, phonemes, visemes, lipsync methods</td>
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<td>8  Skeletal modeling in Lightwave, bones, weight mapping</td>
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<td>9  Modeling and programming characters, skeletal animation, keyframing</td>
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<td>10  Blending keyframe animations, additive blending</td>
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Additional Items